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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/711,682	09/30/2004	Chung-nin Chau	07194.0113U1	5681

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EXAMINER	
HOBAN, MATTHEW E	
ART UNIT	**PAPER NUMBER**
1793	

MAIL DATE	DELIVERY MODE
09/17/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/711,682	CHAU, CHUNG-NIN	
	Examiner	Art Unit	
	Matthew E. Hoban	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 June 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) *1-16* is/are allowed.

6)☒ Claim(s) *17-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/23/2010*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/18/2010 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 17-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Braune in WO01/40403 in view of Huang in his publication entitled "Photoluminescence and electroluminescence of ZnS:Cu nanocrystals in polymeric networks."

Regarding Claim 17 and 26: Braune teaches an electroluminescent lamp comprising a UV diode in combination with a red phosphor of the formula $M_xSi_yN_z$:Eu, wherein M is chosen from Ba, Ca and Sr or a combination thereof, while x and y are preferably 2 and 5 or 1 and 7, respectively (See page 3), where the variable z is based on stoichiometry. This phosphor is blended with another green and blue phosphor and is used in conjunction with a UV diode in order to make a white light source.

Braune is silent as to the use of a ZnS:Cu,Cl phosphor as a component in the blend useful for white LED's having a UV source

However, the use of ZnS:Cu,Cl phosphors as a green phosphor in LED's is known and taught by Wang. This phosphor is excitable by light of the UV wavelength and emits in

the bluish green range of the spectrum at 512 nm (See Figure 2). Thereafter, as Braune teaches that the phosphor of his invention can be combined with green emitting phosphors to create an apparent white light, it would have been obvious to use the phosphor of Wang as it is a known green emitting phosphor useful in color conversion LED's having a UV source. Although ZnS:Cu,Cl is not used as an electroluminescent phosphor in this blend, it would still be considered as such, since this is a property necessarily associated with the Material.

Regarding Claims 18-21: Braune teaches phosphors of the claimed formulae as seen in Table 1.

Regarding Claim 22 and 28: The ratio of ZnS:Cu,Cl and the alkaline earth silicon nitride in the phosphor blend in the light emitting device is a matter of routine experimentation within the art. One of ordinary skill in the art would use an amount of each phosphor in order to achieve a light with sufficient green emission from the ZnS:Cu,Cl in order to produce an apparent white emission from the electroluminescent device as a whole. An insufficient amount of ZnS:Cu,Cl would be incapable of producing a white light as the apparent color of the device would be tinged with a red color, while an excess amount of ZnS:Cu would produce a blue light. Neither of these situations meet the requirements of Braune's device. Thereafter, one of ordinary skill would vary the amount of each phosphor in routine experimentation and would ultimately arrive at a combination of the phosphors falling within the claimed range.

Regarding Claims 23: Wang teaches the use of ZnS:Cu,Cl.

Regarding Claims 24: The alkali earth silicate phosphor of Braune has an excitation range from the UV-blue range, which is a range within the claimed range. Upon excitation in this range the phosphor emits light form 600-680 nm (See Table 1). The ZnS:Cu,Cl phosphor of Wang emits at 512 nm.

Regarding Claim 25 and 27: Braune shows Europium doping from 1-10% of the alkaline earth component (See Tables on Page 8).

Allowable Subject Matter

5. Claims 1-16 allowed.

6. The following is a statement of reasons for the indication of allowable subject matter: The use of a phosphor blend comprising an electroluminescent phosphor used as such and a phosphorescent phosphor excited by said electroluminescent phosphor in the electroluminescent device as claimed is novel over the prior art as the previously applied art did not obviate the claims, as it dealt with the electroluminescent phosphor in conjunction with a phosphorescent pigment (not an inorganic phosphor). Thereafter, it would not have been obvious to use the alkali earth silicate in said electroluminescent device. Furthermore, even in the event where the device is an LED comprising a diode

containing said electroluminescent phosphor with a conversion layer of the silicate, the claims remain novel in that such a device would not contain a blend of said phosphors. For these reasons, it is found that the subject matter as claimed is novel over the prior art and cannot be anticipated nor made obvious.

Response to Arguments

7. Applicant's arguments with respect to claim 1, 17 and 26 have been considered but are moot in view of the new ground(s) of rejection. The teachings of Braune in view of Wang remedy all deficiencies noted in applicant's arguments.

8. Applicant's arguments, see pages 6-8, filed 6/18/2010, with respect to the rejection(s) of claim(s) 1-28 under USC 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Braune in view of Huang. The new rejection remedies all deficiencies noted in arguments provided by applicant. The arguments were found convincing as the prior art previously combined would not necessarily be an obvious combination as the primary reference taught soluble organic based pigments as a red phosphor. The newly applied rejection lacks such issues.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Hoban whose telephone number is (571)

270-3585. The examiner can normally be reached on Monday - Friday from 7:30 AM to 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew E Hoban/
Examiner, Art Unit 1793

/C. Melissa Koslow/
Primary Examiner, Art Unit 1793